

Spatial and Temporal Characteristics of Rossby Waves in the North Pacific From Satellite Altimetry

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A ubiquitous feature of the space-time variability of the ocean is westward propagation. The characteristics of the propagation are largely consistent with the theory of Rossby waves. The sea surface height data collected by satellite altimetry missions have provided new opportunities for investigating these waves. Most previous studies are based on the analysis of Hovmöller diagrams of zonal variability. The present study provides a description of the two-dimensional patterns of westward-propagating signals in the North Pacific. Fourier analysis was performed in frequency and zonal wavenumber. Westward propagating signals were extracted using selected Fourier components. Between 10° N and 40° N, the ratio of westward-propagating variance to eastward-propagating variance is generally larger than a factor of two. The variance of westward-propagating signals is concentrated in the western part of the basin in the regions of the Kuroshio Extension and the Subtropical Counter Current. South of 20° N, the variance of westward propagating signals is highest near the eastern end of the basin, however. North of 40° N, there is no significant dominance of westward-propagating signals. In the eastern part of the basin, the influence of the 1997-99 El Niño /La Niña on the generation of Rossby waves at mid latitudes is clearly revealed in the data. Spatial pattern of the waves and possible forcing mechanisms will be discussed.